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09/818,123	03/27/2001	Frank Sauer	2001P05535US	8633

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

MAILED

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Technology Center 2600

Application Number: 09/818,123
Filing Date: March 27, 2001
Appellant(s): SAUER, FRANK

Michele Conover
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/21/07 appealing from the Office action mailed 3/14/07.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

Billinghurst et al., "The Expert Surgical Assistant: An Intelligent Virtual Environment with Multimodal Input, Proceedings of Medicine Meets Virtual Reality IV", pp. 590-607

Simon, U.S. Patent Number 6,470,207

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 31-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Billinghurst et al., The Expert Surgical Assistant: An Intelligent Virtual Environment with Multimodal Input, Proceedings of Medicine Meets Virtual Reality IV, pp. 590-607, in view of Simon, U.S. Patent Number 6,470,207.

Regarding claim 31, Billinghurst discloses a method for augmented reality guided positioning of a real instrument tip within a real target located in a real object (abstract) comprising the steps of: presenting an augmented reality view by overlaying a virtual graphics guide onto a real view of the real object and a real instrument (figure 2.0, pp. 596), the graphics guide comprising a virtual depth marker located outside of the real object (figure 2.0, pp. 596); aligning the real instrument to the graphics guide (pp. 595, navigation and instrument location)

However, it is noted that Billinghurst fails to disclose inserting the instrument to a depth determined in the augmented view by alignment of a predetermined real feature of the real instrument with the virtual depth marker (page 595), the feature being located along the length of the real instrument at a certain distance from the real instrument tip, and remains external to the real object during insertion (page 595-596)

Simon disclose inserting the instrument to a depth determined in the augmented view by alignment of a predetermined feature of the instrument with the virtual depth marker (col. 9, lines 51-65), the feature being located along the length of the instrument at a certain distance from the instrument tip, and remains external to the object during insertion (figure 10)

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the real instrument and real object augmented positioning as discloses by Billinghurst, the insertion of the instrument to a depth determined by a alignment feature along the length of the instrument, as disclosed by Simon, to allow for medial training applications and navigational assistance in critical anatomical structures.

Regarding claim 32, Billinghurst discloses determining an optimal location for the real instrument with respect to the real target (page 595, paragraph 2, optical tracking for instrument location); calculating the proximity of the predetermined portion of the instrument to the target based on the optimal location and the geometry of the instrument (page 596); using the proximity calculation to determine the position of the virtual depth marker on the graphics guide (page 596).

Regarding claim 33, Simon discloses the proximity calculation comprises a range a proximity measurements (col. 7, lines 45-65).

Regarding claim 34, Simon discloses the proximity calculation corresponds to a final forward position of the predetermined portion of the instrument with respect to the target (col. 9, lines 25-28).

Regarding claim 35, Simon discloses the proximity calculation corresponds to a distance between the virtual depth marker and a point within the target (col. 9, line 51 - col. 10, lines 9).

Regarding claim 36, it is rejected based upon similar rational as above claim 31. Simon further discloses an apparatus for augmented reality guided instrument positioning of an instrument tip within a target located in an object comprising: a virtual graphics guide

generator and positioned for generating and positioning a virtual graphics guide (figure 10), the graphics guide comprising a virtual depth marker located outside of the object; and a rendering device (120, computer, which Examiner interprets as a rendering device) for rendering the virtual graphics guide onto a real view of the object and an instrument (col. 8, lines 30-36) such that the instrument can be inserted to a depth determined in the augmented view by alignment of a predetermined feature of the instrument with the virtual depth marker (col. 9, lines 16-25) inserting the instrument to a depth determined in the augmented view by alignment of a predetermined real feature of the real instrument with the virtual depth marker (page 595), the feature being located along the length of the real instrument at a certain distance from the real instrument tip, and remains external to the real object during insertion (page 595-596).

Regarding claim 37, Billinghurst discloses wherein said virtual graphics guide generator and positioned determines an optimal location for the real instrument with respect to the real target (figure 2.0, pp. 596), and calculates the proximity of said predetermined portion of the real instrument to the real target based on the optimal location and the geometry of the real instrument (page 596, calculates paths to an object and a safe trajectory for instrument movement, showing a safe route to an organ).

Regarding claim 38, Simon discloses the proximity comprises a range of proximities and said virtual graphics guide generator and position determined an optimal range of locations for the predetermined portion of the instrument with respect to the target (col.

7, lines 45-65) and calculates the range of proximities of the predetermined portion of the instrument to the target based on the optimal range and the geometry of the instrument (col. 9, line 51 - col. 10, lines 9).

Regarding claim 39, Simon discloses the proximity corresponds to a final forward position of the predetermined portion of the instrument with respect to the target (col. 9, lines 25-28).

Regarding claim 40, Simon discloses a display device (121, col. 8, lines 31-33) to display the augmented view rendered by the rendering device to the user.

(10) Response to Argument

Applicant argues Billinghurst does not teach inserting the real instrument to a depth in the augmented view by aligning a real feature of the instrument with the virtual depth marker...

> Billinghurst teaches identifying landmarks (i.e. target object/organ) using visual cues, such as highlighting of the real object (i.e. target object/organ), which results in identification/marking of the anatomical structure (i.e. displayed organs) (p. 596, ll. 1-10; Fig. 2).

> Billinghurst teaches inserting an instrument to a depth in the view (p. 596, ll. 1-10), where the virtual instrument has a motion that corresponds to a sensor attached to the surgeon's hand in the real world (p. 594, "The Interface", Para 1).

Applicant argues Simon fails to teach inserting the real instrument to a depth in the augmented view by aligning a real feature of the instrument with the virtual depth marker...

> Simon teaches a surgical instrument "140" having emitters "141" located a distance from the top of the instrument and that remains external during insertion (Fig. 1). Thus, the emitters as disclosed by Simon correspond to a real feature located along the length of the real instrument. Simon teaches displaying a look ahead trajectory "505" to visualize where the instrument would be if it were advanced a predetermined distance in the patient (col. 9, ll. 50-65). Thus, the look ahead trajectory is a virtual depth marker as its last rectangle indicates a depth located at a position outside of a real object to which the instrument is maneuvering. Simon teaches tracking sensor detects the presence and location of emitters "141" (col. 7, ll. 45-51) and dynamically calculates the projection of the instrument as it is moved (col. 9, ll. 23-30). Thus, Simon teaches aligning the real feature (i.e. emitters "141") with the virtual depth marker (i.e. look ahead trajectory "505" of a predetermined distance) as he teaches moving the instrument (i.e. drill "140") during surgery to new positioning the patient anatomy

by detecting the position of the instrument using the tracking sensor and computer (col. 9, ll. 23-50).

Applicant argues Simon fails to teach a rendering device.

Simon teaches a rendering device (i.e. computer) as he teaches displaying x-ray images by a computer and overlaying the images with a graphical representation of an instrument used in an operating room.

Thus, claims 32-35 and 37-40, being dependent upon independent claims 31 and 36 respectively, are not distinguishable over the cited art.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Chante Harrison CH

KEE M. TUNG
SUPERVISORY PATENT EXAMINER

Conferees:

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